REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1.   Objection to Specification

The specification has been revised to place the application in proper U.S. format, and to correct various grammatical and idiomatic errors. Because the changes are all formal in nature (except for the amendments to the description of step 2 on page 5, discussed below), it is respectfully submitted that the changes do not involve new matter.

2.   Rejection of Claims 1-4 Under 35 USC §112, 1st Paragraph

This rejection has been addressed by amending the claims and specification to clarify that the "coupling coefficient" is simply the gain coefficient used to set the gain of the receiver-end chaotic laser signal, as clearly illustrated in Fig. 2 of the present application, and that coupling involves matching the receiver-generated signal to the transmitted signal by having the transmitter signal drive the receiver signal, and by adjusting the gain coefficient so that the message-encoded transmitter signal can be compared with the original chaotic signal re-created at the receiver end. In other words, "coupling" is achieved when the when the gains of the respective chaotic signals match so that the two chaotic signals can be compared and the original encoded message extracted from the received signal.

Simplex coupling by generating a chaotic signal at the receiver end that matches the original chaotic signal from the transmitter is actually a well-known procedure. A detailed description of this procedure is found in U.S. Patent No. 5,291,555 (Cuomo), a copy of which is attached (the Cuomo patent was located as the result of a keyword search at the Patent Office website on November 7, 2003, during preparation of this amendment).

It is respectfully submitted that those skilled in the art could easily have implemented this step of the claimed method based on the general knowledge evidenced by the Cuomo

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patent, and by the detailed description of Fig. 2, so long as it is understood that the "coupling coefficient" is in fact simply the "gain coefficient" illustrated in Fig. 2. The "gain coefficient" is, of course, not a predetermined number, but depends on the amplitude of the signal received from the transmitter. It is noted that the process or coupling or locking onto the signal from the transmitter is analogous to, and basically the same as the process of locking onto an ordinary radio signal, which is also a type of simplex communications.

Because the coupling procedure simply involves matching signals and is in any case well-known, it is respectfully submitted that the description thereof in the original specification would have been sufficient to enable the skilled artisan to make and use the invention, and further that the amendments to page 5 of the specification, which clarify that the coefficient that needs to be adjusted in the "gain" coefficient depicted in Fig. 2 of the application as originally filed, withdrawal of the rejection of claims 1-4 under 35 USC §112, 1st Paragraph, is respectfully requested.

3.   Rejection of Claims 1-4 Under 35 USC §112, 2nd Paragraph

This rejection has been addressed by amending claims 1-4 to correct the various grammatical and idiomatic errors noted in item 5 on page 2 of the Official Action.

4.   Rejection of Claims 1-4 Under 35 USC §102(b) in view of U.S. Patent No. 6,160,651 (Chang)

This rejection is respectfully traversed on the grounds that the Chang patent fails to disclose or suggest a laser-communication system in which demultiplexing is of multiple messages encoded into a chaotic laser signal is facilitated by passing the difference signal resulting from a comparison of transmitter and receiver end chaotic signals through a low pass filter in order to change the chaotic time sequences in the difference signal from a lower fractal dimension to a higher fractal dimension.

While col. 2, lines 31-54 of the Chang patent generally discusses prior chaotic optical encryption, col. 2, lines 55 *et seq.* go on to point out that such synchronization of the chaotic laser signals becomes difficult as the initial conditions used to generate the chaotic laser signals wander, and that the problem of synchronization is compounded in wave division multiplex networks. As a result, the Chang patent proposes to **replace** chaotic optical encryption (as well as quantum optical encryption and spread spectrum techniques) with an entirely different system referred to as Optical Layer Survivability and Security (OLSAS) involving encrypted spectrum spread and packet sequencing using information encoded into individual packet headers. This has nothing to do with chaotic optical communications.

To the contrary, Chang merely mentions chaotic optical encryption for the purpose of discussing disadvantages, the principle one being difficulties in multiplexing. Basically, Chang teaches away from chaotic optical communications because of multiplexing difficulties. **The Chang patent clearly does not disclose or suggest modifying the conventional chaotic communication system to facilitate multiplexing, as in the claimed invention, much less the specific solution of shifting the fractal dimension of the signal to be demultiplexed.** Whereas Chang teaches that chaotic optical communications are not suitable for use in WDM systems, the claimed invention offers an extremely simple solution to the problem of multiplexed chaotic signals, namely use of a low pass filter to shift the fractal dimension of the signals. Shifting the fractal dimension makes certain features stand out, which makes demultiplexing easier (essentially, by eliminating details, in the same manner that increasing the scale of a citymap eliminates local streets but better illustrates the layout of the arterials and freeways).

Because the Chang patent does not even remotely suggest use of a low pass filter to shift the fractal dimension of a difference signal in a synchronized chaotic laser communication system in order to facilitate decoding of multiplexed signals, but to the contrary teaches away from use of chaotic laser communications in multiplexed systems, it is respectfully submitted that the Chang patent neither anticipates nor suggests the claimed

invention, and withdrawal of the rejection of claims 1-4 under 35 USC §102(b) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

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